

## Claims

We claim:

- 1 1. A method for encoding multimedia to be transmitted on a channel,  
2 comprising:  
3       measuring a condition of the channel;  
4       measuring rate and distortion characteristics of the multimedia;  
5       providing a set of error resilient source encoding procedures;  
6       providing a set of channel encoding procedures;  
7       providing a set of transmitter power levels;  
8       providing an objective function and a constraint based on energy  
9 and distortion; and  
10       selecting jointly a particular error resilient source encoding  
11 procedure, a particular channel encoding procedure, and a particular power  
12 level based on the condition of the channel and the rate and distortion  
13 characteristics, while minimizing an objective function and satisfying a  
14 constraint.
- 1 2. The method of claim 1, in which the objective function minimizes energy  
2 while the constraint is a distortion.
- 1 3. The method of claim 1, in which the objective function minimizes  
2 distortion while the constraint is energy.

1 4. The method of claim 1, further comprising:  
2       applying the particular error resilient source encoding procedure to  
3 the multimedia to produce a bit stream;  
4       applying the particular channel encoding procedure to the bitstream  
5 to produce an output signal; and  
6       applying the particular power level to the output signal for  
7 transmission.

1 5. The method of claim 1, in which the bitstream includes a plurality of  
2 layers, and the selecting is performed independently for each layer.

1 6. The method of claim 1, in which the condition includes bandwidth.

1 7. The method of claim 1, in which the multimedia include JPEG 2000  
2 images.

1 8. The method of claim 1, in which the multimedia include moving-JPEG  
2 2000 videos.

1 9. The method of claim 1, in which the objective function is minimized and  
2 the constraint is satisfied by analyzing an energy-distortion curve.

1 10. A system for encoding multimedia to be transmitted on a channel,  
2 comprising:  
3 means for measuring a condition of the channel;  
4 means for measuring rate and distortion characteristics of the  
5 multimedia;  
6 joint source channel coding-power controller means for selecting  
7 jointly an error resilient source encoding procedure, a channel encoding  
8 procedure, and a power level based on the condition of the channel and the  
9 rate and distortion characteristics, while minimizing an objective function  
10 and satisfying a constraint;  
11 a source encoder applying the error resilient source encoding  
12 procedure to the multimedia to produce a bit stream;  
13 a channel encoder applying the channel encoding procedure to the  
14 bitstream to produce an output signal; and  
15 a transmitter applying the particular power level to the output signal  
16 for transmission.